

CLAIMS

1. An apparatus for indication of a charging condition, comprising:
an indication circuit having at least one electromagnet; and
a charge control circuit for controlling charging current to a
5 portable device;

wherein the indication circuit causes the apparatus to
electromagnetically engage the portable device and the charge control circuit
provides charging current to the portable device during the engagement and
wherein the indication circuit causes the apparatus to electromagnetically
10 decouple the portable device when the portable device is charged to a
predetermined level to permit a user to remove the portable device from the
apparatus.

2. The apparatus according to claim 1, wherein the apparatus
15 further comprises at least one contact and wherein the apparatus contact
electrically couples to a contact of the portable device when the apparatus
electromagnetically engages the portable device.

3. The apparatus according to claim 1, wherein the indication
20 circuit provides an engaging current to the electromagnet, wherein the
engaging current causes the electromagnet to generate at least one of an
attractive magnetic field and a repulsive magnetic field.

4. The apparatus according to claim 3, wherein when the electromagnet generates an attractive magnetic field, the electromagnet attracts at least one of a non-magnetized, metallic component of the portable device and an opposite pole magnet of the portable device.

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5. The apparatus according to claim 3, wherein when the electromagnet generates a repulsive magnetic field, the electromagnet repels a like pole magnet of the portable device.

10 6. The apparatus according to claim 2, wherein the electromagnet and the contacts are positioned on a first surface of the apparatus.

7. The apparatus according to claim 2, wherein the electromagnet is positioned on a first surface of the apparatus and the contacts are
15 positioned on a second surface of the apparatus, wherein the second surface opposes the first surface.

8. The apparatus according to claim 1, wherein the electromagnet generates a magnetic field when the apparatus electromagnetically engages
20 the portable device and the magnetic field decreases in strength as the portable device is charged towards the predetermined level.

9. The apparatus according to claim 8, wherein the indication circuit and the charge control circuit are in series.

10. The apparatus according to claim 1, wherein the electromagnet generates a magnetic field when the apparatus electromagnetically engages the portable device and the magnetic field remains at a substantially fixed level as the portable device is charged towards the predetermined level.

11. The apparatus according to claim 10, wherein the indication circuit and the charge control circuit are in parallel.

12. The apparatus according to claim 1, wherein the apparatus further comprises a sensor for determining whether the portable device has been removed from the apparatus.

13. An apparatus for indication of a charging condition, comprising:
an indication circuit having at least one electromagnet; and
a charge control circuit for controlling charging current to a portable device;

wherein the indication circuit causes the apparatus to electromagnetically engage the portable device in a first position and the charge control circuit provides charging current to the portable device during the first position engagement and wherein the indication circuit causes the apparatus to electromagnetically engage the portable device in a second position when the portable device is charged to a predetermined level such that a user is permitted to remove the portable device from the apparatus.

14. A portable device, comprising:
- at least one contact for electrically coupling to at least one
corresponding contact on a charging unit; and
- 5 a magnetically susceptible component;
- wherein the charging unit electromagnetically engages the
magnetically susceptible component and provides a charging current to the
portable device through the contacts of the portable device and the
corresponding contacts of the charging unit during the engagement;
- 10 wherein the charging unit electromagnetically decouples the
portable device when the portable device is charged to a predetermined level
to permit a user to remove the portable device from the charging unit.

15. The portable device according to claim 14, wherein the
- 15 magnetically susceptible component is at least one of a non-magnetized,
metallic component and a magnet.

16. The portable device according to claim 15, wherein the magnet
- of the portable device is a like pole magnet with respect to an electromagnet
- 20 in the charging unit such that the electromagnet generates a repulsive
magnetic field when the charging unit electromagnetically engages the
portable device.

17. A method for indication of a charging condition, comprising the steps of:

electromagnetically engaging a portable device to a charging unit such that the portable device is magnetically urged towards and secured to at least a portion of the charging unit;

supplying charging current to the portable device; and

when the portable device is charged to a predetermined level, electromagnetically decoupling the portable device from the charging unit to permit a user to remove the portable device from the charging unit.

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18. The method according to claim 17, further comprising the steps of:

providing an engaging current to at least one electromagnet of the charging unit, wherein the providing an engaging current step causes the electromagnet to generate at least one of an attractive magnetic field and a repulsive magnetic field.

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19. The method according to claim 17, wherein the charging unit has at least one electromagnet and the method further comprises the steps of:

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generating a magnetic field during the electromagnetically engaging step; and

decreasing the strength of the magnetic field as the portable device is charged towards the predetermined level.

20. The method according to claim 17, wherein the charging unit has at least one electromagnet and the method further comprises the steps of:

5 generating a magnetic field during the electromagnetically engaging step; and

 keeping the strength of the magnetic field at a substantially constant level as the portable device is charged towards the predetermined level.

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21. The method according to claim 17, further comprising the steps of;

 determining whether the portable device has been removed from the charging unit; and

15 in response to the portable device being removed from the charging unit, setting the charging unit to a predetermined charging configuration.

22. The method according to claim 17, wherein the
20 electromagnetically engaging step comprises magnetically urging and securing the portable device to the charging unit with an attractive magnetic field and the electromagnetically decoupling step comprises removing the attractive magnetic field.

23. The method according to claim 17, wherein the
electromagnetically engaging step comprises magnetically urging and
securing the portable device to the charging unit with a repulsive magnetic
field and the electromagnetically decoupling step comprises removing the
5 repulsive magnetic field.

24. A method for indication of a charging condition, comprising the
steps of:
electromagnetically engaging a portable device to a charging
10 unit in a first position such that the portable device is magnetically urged
towards and secured to at least a first portion of the charging unit;
supplying charging current to the portable device; and
when the portable device is charged to a predetermined level,
electromagnetically engaging the portable device to the charging unit in a
15 second position such that the portable device is magnetically urged towards
and secured to a second portion of the charging unit, wherein when the
portable device is in the second position, a user is permitted to remove the
portable device from the charging unit.

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